

**IMPACT FEES**  
**FOR**  
**FIRE PROTECTION FACILITIES**  
**IN**  
**THE VILLAGES**  
**IN**  
**SUMTER COUNTY, FLORIDA**

Henderson  
Young &  
Company

September 5, 2005

## TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. NEXUS OF BENEFITS OF FIRE PROTECTION SERVICES.....	5
3. CAPITAL COST PER FIRE INCIDENT.....	9
4. ANNUAL COST OF FIRE INCIDENTS BY LAND USE.....	15
5. CAPITAL COST PER RESCUE INCIDENT.....	27
6. ANNUAL COST OF RESCUE INCIDENTS BY LAND USE.....	29
7. IMPACT FEE PER UNIT OF DEVELOPMENT.....	38
APPENDIX: CREDITS FOR FIRE STATION CONSTRUCTION .....	41

## LIST OF TABLES

TABLE 1: FIRE PROTECTION SERVICES INVENTORY OF APPARATUS.....	6
TABLE 2: FIRE PROTECTION STATION INVENTORY.....	6
TABLE 3: ANNUALIZED COST OF AERIAL.....	9
TABLE 4: ANNUALIZED COST OF ENGINE.....	10
TABLE 5: ANNUALIZED COST OF RESCUE VEHICLE.....	10
TABLE 6: ANNUALIZED COST OF SQUAD APPARATUS.....	10
TABLE 7: COST PER APPARATUS PER RESPONSE .....	11
TABLE 8: ANNUAL FIRE AND RESCUE INCIDENTS.....	12
TABLE 9: FIRE INCIDENT RESPONSE BY TYPE OF APPARATUS.....	12
TABLE 10: TOTAL APPARATUS COST PER FIRE INCIDENT.....	13
TABLE 11: ANNUALIZED STATION COST PER SQUARE FOOT.....	14
TABLE 12: STATION COST PER FIRE AND RESCUE INCIDENT .....	14
TABLE 13: FIRE INCIDENTS.....	16
TABLE 14: FIRE INCIDENTS AT SPECIFIC LAND USES .....	17
TABLE 15: TRAFFIC RELATED FIRE INCIDENTS (ALLOCATED TO LAND USES).....	18
TABLE 16: TOTAL ANNUAL FIRE INCIDENTS BY LAND USE.....	19
TABLE 17: ANNUAL FIRE INCIDENTS BY LAND USE.....	20
TABLE 18: AERIAL COST OF RESPONSES TO FIRE INCIDENTS AT LAND USE CATEGORIES.....	21
TABLE 19: ENGINE COST OF RESPONSES TO FIRE INCIDENTS AT LAND USE CATEGORIES.....	22
TABLE 20: RESCUE VEHICLE COST OF RESPONSES TO FIRE INCIDENTS AT LAND USE CATEGORIES .....	23
TABLE 21: SQUAD COST OF RESPONSES TO FIRE INCIDENTS AT LAND USE CATEGORIES .....	24
TABLE 22: FIRE STATION COST OF RESPONSES TO FIRE INCIDENTS AT LAND USE CATEGORIES.....	25
TABLE 23: TOTAL CAPITAL COST OF RESPONSES TO FIRE INCIDENTS AT LAND USE CATEGORIES.....	26
TABLE 24: RESCUE INCIDENT RESPONSE BY TYPE OF APPARATUS .....	28
TABLE 25: TOTAL APPARATUS COST PER RESCUE INCIDENT.....	28
TABLE 26: RESCUE INCIDENTS.....	29
TABLE 27: RESCUE INCIDENTS AT SPECIFIC LAND USES.....	30
TABLE 28: TRAFFIC RELATED RESCUE INCIDENTS (ALLOCATED TO LAND USES).....	31
TABLE 29: TOTAL ANNUAL RESCUE INCIDENTS BY LAND USE .....	32
TABLE 30: ANNUAL RESCUE INCIDENTS BY LAND USE.....	33
TABLE 31: ENGINE COST OF RESPONSES TO RESCUE INCIDENTS AT LAND USE CATEGORIES.....	34
TABLE 32: RESCUE VEHICLE COST OF RESPONSES TO RESCUE INCIDENTS AT LAND USE CATEGORIES...35	
TABLE 33: SQUAD COST OF RESPONSES TO RESCUE INCIDENTS AT LAND USE CATEGORIES.....	36
TABLE 34: FIRE STATION COST OF RESPONSES TO RESCUE INCIDENTS AT LAND USE CATEGORIES .....	36
TABLE 35: TOTAL CAPITAL COST OF RESPONSES TO RESCUE INCIDENTS AT LAND USE CATEGORIES.....	37
TABLE 36: FIRE STATION COST OF RESPONSES TO RESCUE INCIDENTS AT LAND USE CATEGORIES .....	39
TABLE 37: IMPACT FEES BY LAND USE.....	40

# 1. INTRODUCTION

This study of impact fees for fire protection facilities for The Villages in Sumter County, Florida presents the methodology, summarizes the data, and explains the calculation of the fees. The methodology is designed to comply with the requirements of Florida law.

## **Definition and Rationale of Impact Fees**

Impact fees are charges paid by new development to reimburse local governments for the capital cost of public facilities that are needed to serve new development and the people who occupy the new development. New development is synonymous with "growth."

Local governments charge impact fees on either of two bases. First, as a matter of policy and legislative discretion, they may want new development to pay the full cost of its share of new public facilities because that portion of the facilities would not be needed except to serve the new development. In this case, the new development is required to pay for all the cost of its share of new public facilities.

On the other hand, local governments may use other sources of revenue to pay for the new public facilities that are required to serve new development. If, however, such revenues are not sufficient to cover the entire costs of new facilities necessitated by new development, the new development may be required to pay an impact fee in an amount equal to the difference between the total cost and the other sources of revenue.

There are many kinds of "public facilities" that are needed by new development, including fire protection facilities, parks, schools, roads, water and sewer plants, libraries, and other government facilities. This study covers fire protection facilities in the Villages in Sumter County, Florida. Impact fees for fire protection facilities are charged to all residential and non-residential development within the Villages in Sumter County.

## **Rules Governing Impact Fees in Florida**

Impact fees for public facilities have been upheld by the Florida Supreme Court. Several court cases<sup>1</sup> provide direction in three broad areas of the development of impact fees: (1) who pays, and how much (the "fair share" rules), (2) where and how the fee can be used (the dual "nexus of benefit" rules), and (3) offsets against the fee (the "credits" rules).

First, the "fair share" rules require that impact fees can be charged only for the portion of the cost of public capital facilities that is attributable to new development. Impact fees cannot be charged to pay for the cost of reducing or eliminating deficiencies in existing facilities. Within this broad rule, specific guidance is given in several areas:

- It is permitted to distinguish among the impacts of different types of growth in establishing fee amounts (i.e., residential development can be shown to have different impacts than retail development, therefore the impact fees for each type of development can be different than the other types).
- Fee-payers should be able to pay a smaller fee if they can demonstrate that their development will have less impact than is presumed in the calculation of the impact fee schedule for their classification of property. Such reduced impact must be permanent and enforceable (i.e., through land use restrictions).
- Costs of facilities that will be used by new development and existing users must be apportioned between the two groups in determining the amount of the fee. For example, the cost of the facility can be divided by its capacity to calculate the cost per unit of capacity. New development and existing development are both charged the same cost per unit, thus ensuring equitable cost apportionment.

---

<sup>1</sup> The following five significant court cases guide the development of impact fees in Florida: Contractors and Builders Association of Pinellas County v. City of Dunedin, 329 So.2d 314 (Fla. 1976); Hollywood, Inc. v. Broward County, 431 So.2d 606 (Fla. 4th DCA 1983); Home Builders and Contractors Association of Palm Beach County, Inc. v. Board of County Commissioners of Palm Beach County, 446 So.2d 140 (Fla. 4th DCA 1983); and Seminole County v. City of Casselberry, 541 So.2d 666 (Fla. 5th DCA 1989); City of Ormond Beach v. County of Volusia, 535 So.2d 302 (Fla. 5th DCA 1968). The Local Government Comprehensive Planning and Land Development Regulation Act also touches on some aspects of impact fees.

Second, the dual "nexus of benefit" rules require a demonstrated reasonable connection (1) between the need for public capital facilities and the growth from the fee-paying development, and (2) between the expenditure of fee revenue and the benefits received by the fee-paying development. These two conditions limit where and when impact fees can be collected and used.

There are many ways that the nexus of benefit can be established, including personal use and use by others in the family (direct benefit), use by persons who provide goods or services to the fee-paying property (indirect benefit), and geographical proximity (presumed benefit). The connections among needs, benefits and fees will vary according to the type of facility: libraries will have different nexus of benefits criteria than roads. The nexus of benefit for fire protection services will be based on the demand for fire and rescue services by each type of land use. A detailed description of this data is presented later in this study.

Another connection among needs, benefits and fees can be the geographical relationship between a fee-paying development and the impact on a public capital facility. Some impact fees for roads or parks use geographical zones for calculating, collecting and spending impact fees. The benefits provided by individual fire and rescue apparatus are not limited to geographic areas surrounding each station because the apparatus are frequently called upon to assist with an incident in a different area of the county when the seriousness of the incident suggests a need for additional units or when backup is requested. These response policies make fire and rescue function as a single system, and all properties benefit from improvements to any part of the system, therefore the fire and rescue impact fee for each land use category is calculated, collected, and expended in a single "zone" covering the entire geographic service area of the portion of the Villages that is within the boundaries of Sumter County.

Furthermore the fee revenue must be expended within a reasonable period of time, but there is no single maximum limit that applies to all impact fee expenditures. Explicit limitations on the expenditure of fees must be adequate to guide government personnel, and fee revenue must be earmarked for specific uses related to the public capital facilities. These and other requirements pertaining to the use of impact fees are contained in the impact fee ordinance.

Finally, the "credits" rules allow a fee-payer to have an impact fee reduced to reflect (1) contributions of land, cash, facilities, or other assets that meet the same need as the fee, and (2) future payments of taxes that would ordinarily be used for the same public capital facilities for which the impact fee is being charged. Without such credits, the fee-paying development might pay more than its fair share. Court cases and legislation do not prohibit a local government from establishing

reasonable constraints on determining credits. For example, the location, quality and design of a donated public facility should conform to adopted local standards for such facilities.

The credit for contributions of land, cash, facilities and other assets is addressed in the impact fee ordinance. The credit for future payments of taxes is addressed in this rate study.

## **Data Sources**

The data in this study of impact fees for fire protection services in the Villages in Sumter County, Florida was provided by the Villages unless a different source is specifically cited.

## **Data Rounding**

The data in this study was prepared using computer spreadsheet software. In some tables in this study, there will be very small variations from the results that would be obtained using a calculator to compute the same data. The reason for these insignificant differences is that the spreadsheet software was allowed to calculate results to more places after the decimal than is reported in the tables of these reports. The calculation to extra places after the decimal increases the accuracy of the end results, but causes occasional differences due to rounding of data that appears in this study.

## 2. NEXUS OF BENEFITS OF FIRE PROTECTION SERVICES

As described in the introduction, there must be a dual nexus between the benefits of fire protection services and new development that is charged an impact fee to pay for a portion of the fire and rescue services that it needs. This chapter is devoted to an analysis of the nexus.

There are several considerations that affect the "rational nexus of benefits" for fire protection services impact fees: (A) responsibility for fire protection services, (B) the need for new fire protection services facilities for new development, (C) the type of property that receives the benefits from new fire protection services facilities, (D) the location of the property in relation to the new fire protection services facilities, and (E) responsibility for impact fees for The Villages.

### A. Responsibility for Fire Protection Services.

The Villages Public Safety Department is the sole provider of fire protection and first response advanced life support services within the Villages Center Community Development District. The Villages Public Safety Department inventory includes 7 primary response apparatus operating out of 3 stations. A summary inventory of the County's primary response apparatus is shown in Table 1, and the stations are listed in Table 2.

The average annual responses for *one* of each type of fire and rescue apparatus is also shown in Table 1. The average number of emergency responses per type of apparatus is calculated by dividing the number of annual emergency runs by the number of apparatus making those runs. In many cases, more than one apparatus is dispatched to an emergency incident. The number and type of apparatus dispatched to each incident varies depending on the type and severity of the incident.

In addition to the primary response apparatus, the Villages Public Safety Department has 1 reserve apparatus that is dispatched as needed when a primary unit is out of service for repairs or maintenance. The reserve unit is not routinely dispatched and is excluded from the impact fee analysis because it is not used frequently enough to have a material effect on the cost of providing fire and rescue services.



**Table 1: Fire Protection Services Inventory of Apparatus**

Type of Apparatus	Primary Response Apparatus Inventory	Annual Emergency Responses	Average Emergency Responses Per Apparatus
Aerial	1	144	144
Engine	2	2,340	1,170
Rescue	2	1,534	767
Squad	2	1,872	936
Total Primary Response	7	5,890	

The Villages Public Safety Department provides fire and rescue services out of 3 stations. Table 2 shows the square footage of these 3 stations. Table 2 also shows the total fire and rescue incidents, and the average square feet of fire station per incident (calculated by dividing the total square footage of all fire stations by the number of annual incidents).

**Table 2: Fire Protection Station Inventory**

Station	Fire Protection Station Inventory (Square Footage)	Annual Fire and Rescue Incidents	Station Square Feet per Incident
Station 1	3,500		
Station 2	1,500		
Station 3	4,000		
Total	9,000	1,181	7.62

## **B. The Need for New Fire Protection Services Facilities to Serve New Development**

The need for fire protection services facilities is influenced by a variety of factors, such as response time, call loads, geographical area, topographic and manmade barriers, and standards of the National Fire Protection Association.

For the purpose of quantifying the need for fire protection services apparatus and stations, this study uses the ratio of emergency incidents to fire and rescue units and stations. As greater growth occurs, more incidents occur, therefore more apparatus and stations are needed to maintain standards.

During 2003, the Villages Public Safety Department operated 7 primary response units which were dispatched a total of 5,890 times to 2,160 emergency incidents (many times the seriousness of an incident requires that more than one unit respond). The analysis and text documenting the ratio of each type of apparatus to fire and rescue incidents are explained in chapters 3 and 5. (Note: the responses from apparatus at station 3 have been annualized because the station was only operational for 3 months during 2003.)

### **C. Types of Property Benefiting from New Fire Protection Services Facilities;**

Impact fees are charged to properties that benefit from new fire protection services facilities. Fire protection services are provided by the Villages in Sumter County to all properties regardless of the type of use of the property, therefore the fire protection services impact fees are charged to all residential and non-residential development within the portion of the Villages inside the boundaries of Sumter County. Fire protection services impact fee rates are calculated separately for each type of land use.

### **D. Location of Property Receiving Benefits from New Fire Protection Services Facilities**

As described earlier, a nexus of benefits is required between a new unit of development and the fire protection services facilities that are paid for by the impact fees from new development. One method of connecting a unit of development and a fire protection services facility would be to establish impact fee "zones" within the fire protection services facility service area. All impact fees paid by new development in the zone would be required to be spent on new fire protection services facilities in the same zone.

However, the benefits provided by individual fire protection services units are not limited to geographic areas surrounding each station within the Villages in Sumter County because the apparatus are frequently called upon to assist with an incident in a different area of the Villages when the seriousness of the call suggests a need for additional units, when a backup unit is requested, or when the nearest unit is busy responding to a call received earlier. These response policies make fire protection services function as a single system, and all properties benefit from improvements to any part of the system, therefore the fire protection services impact fee for each land use category is calculated, collected, and expended in a single "zone" covering all of the Villages that is within the boundaries of Sumter County.

## **E. Responsibility for Impact Fees for The Villages.**

The Villages Center Community Development District (District) spans portions of three counties: Sumter, Marion and Lake. Sumter County covers a large geographical area, only a portion of which includes part of the District. In other words, part of the District is in part of Sumter County, and both entities have areas that are not in each other's jurisdiction.

Sumter County has the authority to establish impact fees in the portion of the District that is within Sumter County. Sumter County is also establishing a fire impact fee for the rest of Sumter County. The two impact fees will be comparable in methodologies, but different in the factual basis for the impact fees because Sumter County Fire and Rescue and the Villages Public Safety Department have important differences in levels of service, costs of apparatus and stations, and incident rates of emergency calls by various types of land use.

Some data used in this study is based on the entire Villages Public Safety Department, and some data is based only on the portion of The Villages that is inside the boundaries of Sumter County. Specifically, the data for calculating the level of service (i.e., call volume per apparatus and per station) and the cost of apparatus and stations are from the entire Villages Public Safety Department because the Department functions as a unified agency that can dispatch emergency apparatus from any station to any emergency within its service area. Conversely, the data for determining the demand placed on the Villages Public Safety Department (i.e., emergency calls per dwelling unit and per square foot of commercial property) are from the properties that are within the Sumter County portion of the District because the incident rates need to reflect the properties that are paying the impact fee.

### 3. CAPITAL COST PER FIRE INCIDENT

This chapter identifies the capital cost of fire protection apparatus and stations that are the basis for emergency responses to fire incidents.

#### Annual Cost Per Apparatus

The first step in calculating the apparatus cost per fire incident is to identify and annualize the cost per type of apparatus. The capital cost per type of apparatus is based on the cost of primary response apparatus and major support equipment. The annualized capital cost per apparatus is determined by dividing the capital cost of each type of apparatus by its useful life:

$$\begin{array}{ccccccc} \text{Fire} & & & & & & \text{Annual} \\ \text{Apparatus} & \div & \text{Useful Life} & = & & & \text{Cost per} \\ \text{Cost} & & & & & & \text{Apparatus} \end{array}$$

Tables 3 through 6 show the annualized cost for each type of primary apparatus listed in Table 1: Aerial, Engine, Rescue Vehicle and a Squad Apparatus. Major components of the apparatus are listed in the first column of Tables 3 through 6. The apparatus and equipment costs in Tables 3 through 6 represent current costs to purchase a new fully equipped apparatus.

Tables 3 through 6 also show the number of years of useful life of the cost components of each type of apparatus. The annualized cost is calculated by dividing each component's cost by the useful life of that component.

***Table 3: Annualized Cost of Aerial***

Cost Component	Total Cost per Component	Useful Life of Component (Years)	Annual Cost
Vehicle	\$ 680,000	20	\$ 34,000.00
Communications	10,000	20	500.00
Equipment	<u>155,000</u>	20	<u>7,750.00</u>
Total: Vehicle and Equipment	\$845,000		42,250.00

**Table 4: Annualized Cost of Engine**

Cost Component	Total Cost per Component	Useful Life of Component (Years)	Annual Cost
Vehicle	\$ 245,000	15	\$ 16,333.33
Communications	10,000	15	666.67
Equipment	117,000	15	7,800.00
Total: Vehicle and Equipment	372,000		24,800.00

**Table 5: Annualized Cost of Rescue Vehicle**

Cost Component	Total Cost per Component	Useful Life of Component (Years)	Annual Cost
Vehicle	\$ 45,253	7	\$ 6,464.71
Communications	5,000	7	714.29
Equipment	80,672	7	11,524.57
Total: Vehicle and Equipment	130,925		18,703.57

**Table 6: Annualized Cost of Squad Apparatus**

Cost Component	Total Cost per Component	Useful Life of Component (Years)	Annual Cost
Vehicle	\$ 90,253	7	\$ 12,893.29
Communications	5,000	7	714.29
Equipment	92,672	7	13,238.86
Total: Vehicle and Equipment	187,925		26,846.43

### **Cost Per Apparatus Per Fire or Rescue Incident**

The capital cost per fire or rescue incident is calculated for each apparatus by dividing the annualized cost per apparatus by the total annual incidents (both fire and rescue) each type of apparatus responds to. Each type of apparatus is analyzed separately because the number and type of apparatus responding to an incident varies depending on the type and severity of the incident.

$$\begin{array}{ccccc} \text{Annual Cost} & & \text{Annual} & & \text{Cost} \\ \text{Per} & \div & \text{Responses Per} & = & \text{Per Apparatus} \\ \text{Apparatus} & & \text{Apparatus} & & \text{Per Response} \end{array}$$

In Table 7 the cost per emergency response is calculated for each type of apparatus. Table 7 shows the annualized cost of *one* of each type of apparatus (from Tables 3 through 6) and the average annual emergency responses for each type of apparatus (from Table 1). Each apparatus cost per response is calculated by dividing the annualized cost of that type of apparatus by the total number of annual responses for the same type of apparatus.

***Table 7: Cost per Apparatus per Response***

Type Of Apparatus	Annual Apparatus Cost	Average Annual Responses Per Rescue Unit	Apparatus Cost Per Response
Aerial	\$ 42,250.00	144	\$ 293.40
Engine	24,800.00	1,170	21.20
Rescue	18,703.57	767	24.39
Squad	26,846.43	936	28.68

### **Total Apparatus Cost Per Fire Incident**

The total apparatus cost per fire incident is calculated by multiplying the cost per apparatus per response by the percent of fire incidents each type of apparatus responds to. This calculation accounts for the fact that multiple apparatus are dispatched to many incidents. The result of this calculation is a weighted average total cost of apparatus per fire incident.

$$\begin{array}{ccccc} \text{Cost} & & \text{Apparatus} & & \text{Total} \\ \text{Per Apparatus} & \times & \text{Percent of} & = & \text{Apparatus Cost Per} \\ \text{Per Response} & & \text{Fire Responses} & & \text{Fire Incident} \end{array}$$

The next step in calculating the apparatus cost per fire incident is to identify the annual number of incidents that the Villages Public Safety Department responded to. Emergency incidents are separated into two categories: Fire and

Rescue. Table 8 lists the annual number of fire and rescue incidents responded to during 2003 in the Sumter County portion of the Villages.

**Table 8: Annual Fire and Rescue Incidents**

Type of Incident	Annual Incidents
Fire	139
Rescue	<u>1,042</u>
Total Annual	1,181

Different types of fire emergencies need different types or combinations of apparatus. As a result, the usage of apparatus varies among the types of apparatus. This variance is an important factor in determining the cost per incident. The percent of fire responses by each type of apparatus is calculated in Table 9 by dividing the annual fire responses for each type of apparatus by the total annual fire incidents from Table 8. The result of the calculation in Table 9 is the percent of fire incidents responded to by each type of apparatus. For example, Engines provided 410 responses to the 377 fire incidents, equaling 108.8% of all fire incidents. Another way to understand this data is that one average fire incident involved 1.088 engines, therefore the cost of responding to a fire incident includes 108.8% of the cost of an Engine.

**Table 9: Fire Incident Response By Type of Apparatus**

Type Of Apparatus	Total Annual Fire Responses For All Apparatus	Annual Fire Incidents	Percent of Fire Incidents Dispatched To
Aerial	144		38.2%
Engine	410		108.8%
Rescue	194		51.5%
Squad	<u>326</u>		86.5%
Total	1,074	377	

The final step in calculating the apparatus cost per fire incident is shown in Table 10. The cost per response for each type of apparatus (from Table 7) is multiplied by the percent of fire incidents dispatched to (from Table 9) resulting in the total apparatus cost per fire incident.

The “bottom line” in Table 10 is the apparatus cost per fire incident of \$172.47. In other words, every fire incident “uses up” \$172.47 worth of apparatus.

***Table 10: Total Apparatus Cost Per Fire Incident***

Type Of Apparatus	Apparatus Cost Per Response	Annual Percent Of Fire Incidents Dispatched To	Apparatus Cost Per Fire Incident
Aerial	\$ 293.40	38.2%	\$ 112.07
Engine	21.20	108.8%	23.05
Rescue	24.39	51.5%	12.55
Squad	28.68	86.5%	<u>24.80</u>
Total			172.47

### **Annual Station Cost**

The annual station cost is determined by dividing the station capital cost by its useful life.

$$\begin{array}{ccccc} \text{Station} & & & & \text{Annual} \\ \text{Cost Per} & \div & \text{Useful Life} & = & \text{Station Cost} \\ \text{Square Foot} & & & & \text{Per Square Foot} \end{array}$$

Table 11 calculates the average annualized fire station cost per square foot. Each component of the station cost is listed along with the cost per square foot for each component. The cost per square foot is based on the average estimated cost of planned stations 4 and 5.

The useful life represents the length of time the station will last before requiring significant capital cost for repair or renovation. The annualized cost is calculated by dividing the estimated cost per square foot by the average useful life. The “bottom line” of Table 11 is an annualized station cost of \$9.34 per square foot.



**Table 11: Annualized Station Cost Per Square Foot**

Type Of Cost	Average Cost Per Square Foot of Building
Land	\$ 57.25
Building	217.56
Furnishings	<u>5.50</u>
Total Station Cost	\$ 280.31
Useful Life (years)	<u>30</u>
Annual Cost per Square Foot	\$ 9.34

### **Station Cost Per Fire and Rescue Incident**

The station cost per fire and rescue incident is calculated by multiplying the annual station cost per square foot by the station square feet per fire and rescue incident.

$$\begin{array}{rcccl}
 \text{Annual} & & \text{Station} & & \text{Station} \\
 \text{Station Cost} & \times & \text{Square Feet} & = & \text{Cost Per} \\
 \text{Per Square Foot} & & \text{Per Fire and} & & \text{Fire and Rescue} \\
 & & \text{Rescue Incident} & & \text{Incident}
 \end{array}$$

This calculation is shown in Table 12: the station cost per square foot (from Table 11) is multiplied times the station square feet per incident (from Table 2). The result is the station cost of \$71.20 per fire and rescue incident. In other words, each fire and rescue incident “uses up” \$71.20 worth of fire station.

**Table 12: Station Cost Per Fire and Rescue Incident**

Annual Station Cost Per Square Foot	Square Feet Per Fire and Rescue Incident	Station Cost Per Fire and Rescue Incident
\$ 9.34	7.62	\$ 71.20

## 4. ANNUAL COST OF FIRE INCIDENTS BY LAND USE

This chapter identifies the number and cost of responses to fire incidents at each type of land use.

### Annual Fire Incident Rate Per Unit Of Development

The annual fire incident rate per unit of development (i.e., dwelling unit or square foot of non-residential development) is calculated by dividing the total annual fire incidents to each type of land use by the number of dwelling units or square feet of non-residential development for that type of land use in the portion of the Villages inside the boundaries of Sumter County.

$$\begin{array}{ccccc} \text{Annual} & & \text{Number of} & & \text{Annual} \\ \text{Emergency Fire} & & \text{Dwelling Units} & & \text{Fire Incidents} \\ \text{Incidents} & \div & \text{or Square Feet} & = & \text{Per} \\ \text{At} & & \text{Of} & & \text{Unit Of} \\ \text{Each Type} & & \text{Each Type} & & \text{Development} \\ \text{Of Land Use} & & \text{Of Land Use} & & \end{array}$$

The Villages Public Safety Department database identifies each incident by fixed property use categories designated by the National Fire Incident Reporting System (NFIRS). The 7 land use categories in this study were created by matching the NFIRS incident database to the Property Appraiser's property use codes. The land use codes of NFIRS and the Property Appraiser have been combined into broad land use categories for impact fees, such as Residential, Retail and Schools/Colleges.

During 2003 the Villages Public Safety Department responded to 139 fire incidents within the Sumter County portion of the Villages fire service area. Of the 139 fire incidents, 122 were traceable to a type of development (i.e., the incident occurred at a specific type of property such as a residence or business) or they were traffic-related (occurred on a roadway) and were included in the following detailed analysis of incidents to land uses. Of the 122 fire incidents analyzed, 101 occurred at a specific type of property and 21 were traffic-related. The remaining 17 fire incidents were not traceable to either a type of land use or a traffic-related incident. Table 13 shows the allocation of the 17 incidents without land use designations to the property and traffic categories using the same basis as the 122 incidents for which a location was identifiable. Thus 115 of the 139 fire incidents were allocated

the same as the incidents at identifiable lands uses, and the other 24 fire incidents were allocated the same as the traffic-related incidents.

***Table 13: Fire Incidents***

Incident Location	Incidents Identifiable by Location	Incidents Not Identifiable by Location	Total Incidents
Total	122	17	139
At Properties	101	14	115
% of Total	82.79%	82.79%	82.79%
In Roads and Streets	21	3	24
% of Total	17.21%	17.21%	17.21%

There are four tables on the following pages that present the allocation of fire incidents among types of land use: Table 14 shows the fire incidents that were identifiable by land use type, Table 15 shows the fire incidents that were traffic-related. Table 16 combines the fire incident data, and Table 17 shows the fire incident rate per unit of development.

Table 14 shows the distribution of the 101 fire incidents that are direct to a land use along with the percent distribution of these 101 incidents. In the right hand column the total 115 fire incidents to land use (101 traceable + 14 allocated) is allocated among the land use types using the percent distribution column. The result is the total annual fire incidents at each of the land use types.

*Table 14: Fire Incidents At Specific Land Uses*

Land Use	Annual Fire Incidents Identifiable To Land Use	Percent Of All Fire Incidents Identifiable To Land Use	Annual Fire Incidents Allocated To Land Uses (% x 115)
Residential	61	60.40%	70
<u>Non-Residential</u>			
Hospital/Clinic	10	9.90%	11
Nursing Home	5	4.95%	6
Retail	6	5.94%	7
Restaurant/Bar/Lounge	4	3.96%	5
Leisure/Outdoors	10	9.90%	11
Schools/Colleges	<u>5</u>	<u>4.95%</u>	<u>6</u>
Total	101	100.00%	115

The traffic-related fire incidents are allocated to land uses on the basis of the amount of traffic generated by each type of land use. In Table 15, the number of dwelling units and square feet of non-residential construction in the Sumter County portion of the Villages Public Safety Department service area is multiplied times the number of trips that are generated by each land use type as reported in the 7<sup>th</sup> Edition of Trip Generation by the Institute of Transportation Engineers (ITE). (The trip rates in are one-half of ITE's trip rates in order to account for the trips each land use generates while excluding the "return" trip). The result is the total trips associated with each land use type. The percent of trips associated with each land use type is calculated from the total of all trips.

In the final calculation in Table 15 the total 24 annual fire incidents that are traffic-related (21 traceable + 3 allocated) is allocated among the land use types using the percent of trips generated.

*Table 15: Traffic Related Fire Incidents (Allocated to Land Uses)*

Land Use	Units Of Development in Villages (Sumter County Portion)	ITE Trip Generation Rate ÷ 2 Per Unit Of Development	Total Trips	Percent Of Trips Generated (Trips ÷ 61,502)	Annual Traffic Related Fire Incidents Per Unit Of Development (% x 24)
Residential	10,951 d.u	4.78500	52,401	85.20%	20
<u>Non-Residential</u>					
Hospital/Clinic	101,764 sq.ft	0.00879	895	1.45%	0
Nursing Home	26,287 sq.ft	0.00305	80	0.13%	0
Retail	140,636 sq.ft	0.02147	3,019	4.91%	1
Restaurant/Bar/Lounge	52,246 sq.ft	0.06358	3,322	5.40%	1
Leisure/Outdoors	26,083 sq.ft	0.01166	304	0.49%	0
Schools/Colleges	229,689 sq.ft	0.00645	<u>1,481</u>	2.41%	1
Total			61,502		24

Table 16 summarizes the results of the analysis of fire incidents. The total annual fire incidents is a combination of the fire incidents allocated among direct responses to land use categories (from Table 14) and the allocation of traffic-related incidents based on trip generation rates (from Table 15).

***Table 16: Total Annual Fire Incidents By Land Use***

Land Use	Annual Fire Incidents Direct To Land Use	Annual Traffic Related Fire Incidents By Land Use	Total Annual Fire Incidents By Land Use
Residential	70	20	90
Non-Residential			
Hospital/Clinic	11	0	12
Nursing Home	6	0	6
Retail	7	1	8
Restaurant/Bar/Lounge	5	1	6
Leisure/Outdoors	11	0	12
Schools/Colleges	<u>6</u>	<u>1</u>	<u>6</u>
Total	115	24	139

The final step in determining the annual fire incident rate per unit of development is shown in Table 17. The total annual fire incidents for each type of land use (from Table 16) are divided by the number of dwelling units or square feet of structures to calculate the annual incident rate per dwelling unit or square foot. The units of development are the same as was used to determine traffic-related incidents (see Table 15).

The results in Table 17 show how many times an average unit of development in the Sumter County portion of the Villages has a fire incident to which Villages Public Safety Department responds. For example, a residential dwelling unit has an average of 0.0082 fire-related incidents per year. This is the same as saying that 0.82% of residential dwellings have a fire-related incident in a year.

**Table 17: Annual Fire Incidents By Land Use**

Land Use	Total Annual Fire Incidents at Land Uses	Units Of Development	Annual Fire Incidents Per Unit Of Development
Residential	90	10,951 d.u	0.0082000 per dwelling unit
Non-Residential			
Hospital/Clinic	12	101,764 sq.ft	0.0001154 per sq ft
Nursing Home	6	26,287 sq.ft	0.0002179 per sq ft
Retail	8	140,636 sq.ft	0.0000570 per sq ft
Restaurant/Bar/Lounge	6	52,246 sq.ft	0.0001120 per sq ft
Leisure/Outdoors	12	26,083 sq.ft	0.0004414 per sq ft
Schools/Colleges	6	229,689 sq.ft	0.0000273 per sq ft
Total	139		

### **Fire Incident Capital Cost Per Unit Of Development**

The capital cost of fire incidents per unit of development is determined by multiplying the annual fire incidents per unit of development (from Table 17) times the annual capital cost per fire incident of each type of apparatus (from Table 10)

and fire station (from Table 12), then multiplying that result times the useful life of the apparatus or fire station.<sup>2</sup>

$$\begin{array}{ccccccccc} \text{Annual Fire} & & \text{Annual Cost} & & \text{Useful} & & \text{Fire Incident} \\ \text{Incidents Per} & \times & \text{Per Fire} & \times & \text{Life Of} & = & \text{Capital Cost} \\ \text{Unit Of} & & \text{Incident} & & \text{Apparatus} & & \text{Per Unit Of} \\ \text{Development} & & & & \text{or Station} & & \text{Development} \end{array}$$

In Tables 18 – 22 on the following pages, each fire incident rate (from Table 17) is multiplied by the annual capital cost per fire incident. The result is then multiplied times the useful life of the apparatus or station to calculate the capital cost per unit of development for each type of apparatus and station.

For example, residential dwelling units average 0.0082 fire incidents per year (i.e., 0.8% of a fire incident per year). In Table 18, multiplying this incident rate times the annual capital cost of aerial trucks (\$112.07) per incident indicates a cost of \$0.92 per dwelling unit to provide it with aerial trucks for one year. Since the aerial truck lasts 20 years, the residential dwelling needs to pay for 20 times the annual rate, for a total of \$18.3972.

***Table 18: Aerial Cost Of Responses to Fire Incidents at Land Use Categories***

Land Use	Annual Fire Incidents Per Unit of Development	Annual Aerial Cost At \$112.07 Per Incident	Total Aerial Tower Cost At 20 Year Life
Residential	per dwelling unit 0.0082000	0.9199	18.3972
<b><u>Non-Residential</u></b>			
Hospital/Clinic	per sq. ft. 0.0001154	0.0129	0.2586
Nursing Home	per sq. ft. 0.0002179	0.0244	0.4884
Retail	per sq. ft. 0.0000570	0.0064	0.1277
Restaurant/Bar/Lounge	per sq. ft. 0.0001120	0.0125	0.2510
Leisure/Outdoors	per sq. ft. 0.0004414	0.0495	0.9892
Schools/Colleges	per sq. ft. 0.0000273	0.0031	0.0612

<sup>2</sup> Some fire impact fees are calculated for the economic life of the property paying the impact fee, rather than the useful life of the apparatus and stations that provide the fire protection. Both methods meet the legal requirements for impact fees. The choice of method is made by the local government adopting the impact fee. Sumter County decided to use the useful life of the apparatus and fire stations.



Table 19 calculates the capital cost per unit of development for engines responding to fire incidents. The incident rate (from Table 17) is multiplied by the engine's capital cost per fire incident (\$23.05 from Table 10). The result is then multiplied times the 15-year useful life of an engine to calculate the capital cost per unit of development for engines.

***Table 19: Engine Cost Of Responses to Fire Incidents at Land Use Categories***

Land Use	Annual Fire Incidents Per Unit of Development	Annual Engine Cost At \$23.05 Per Incident	Engine Cost At 15 Year Life
Residential	per dwelling unit 0.0082000	0.1892	2.8381
<u>Non-Residential</u>			
Hospital/Clinic	per sq. ft. 0.0001154	0.0027	0.0399
Nursing Home	per sq. ft. 0.0002179	0.0050	0.0753
Retail	per sq. ft. 0.0000570	0.0013	0.0197
Restaurant/Bar/Lounge	per sq. ft. 0.0001120	0.0026	0.0387
Leisure/Outdoors	per sq. ft. 0.0004414	0.0102	0.1526
Schools/Colleges	per sq. ft. 0.0000273	0.0006	0.0094

Table 20 calculates the capital cost per unit of development for rescue vehicles responding to fire incidents. The incident rate (from Table 17) is multiplied by the rescue vehicle's capital cost per fire incident (\$12.55 from Table 10). The result is then multiplied times the 7-year useful life of a rescue vehicle to calculate the capital cost per unit of development for rescue vehicles.

***Table 20: Rescue Vehicle Cost Of Responses to Fire Incidents at Land Use Categories***

Land Use	Unit of Development	Annual Fire Incidents Per	Annual Rescue Cost At \$12.55 Per Incident	Rescue Brush Cost At 7 Year Life
Residential	per dwelling unit	0.0082000	0.1030	0.7210
<u>Non-Residential</u>				
Hospital/Clinic	per sq. ft.	0.0001154	0.0014	0.0217
Nursing Home	per sq. ft.	0.0002179	0.0027	0.0410
Retail	per sq. ft.	0.0000570	0.0007	0.0107
Restaurant/Bar/Lounge	per sq. ft.	0.0001120	0.0014	0.0211
Leisure/Outdoors	per sq. ft.	0.0004414	0.0055	0.0831
Schools/Colleges	per sq. ft.	0.0000273	0.0003	0.0051

Table 21 calculates the capital cost per unit of development for squad vehicles responding to fire incidents. The incident rate (from Table 17) is multiplied by the squad apparatus capital cost per fire incident (\$24.80 from Table 10). The result is then multiplied times the 7-year useful life of a squad apparatus to calculate the capital cost per unit of development for tender tankers.

*Table 21: Squad Cost Of Responses to Fire Incidents at Land Use Categories*

Land Use	Annual Fire Incidents Per Unit of Development	Annual Squad Cost At \$24.80 Per Incident	Squad Cost At 7 Year Life
Residential	per dwelling unit 0.0082000	0.2036	1.4250
<u>Non-Residential</u>			
Hospital/Clinic	per sq. ft. 0.0001154	0.0029	0.0200
Nursing Home	per sq. ft. 0.0002179	0.0054	0.0378
Retail	per sq. ft. 0.0000570	0.0014	0.0099
Restaurant/Bar/Lounge	per sq. ft. 0.0001120	0.0028	0.0194
Leisure/Outdoors	per sq. ft. 0.0004414	0.0109	0.0766
Schools/Colleges	per sq. ft. 0.0000273	0.0007	0.0047

Table 22 calculates the capital cost per unit of development for fire stations that house fire apparatus. The fire incident rate (from Table 17) is multiplied by the fire station's capital cost per fire and rescue incident (\$71.20 from Table 12). The result is then multiplied times the 30-year useful life of a fire station to calculate the capital cost per unit of development for fire stations.

***Table 22: Fire Station Cost Of Responses to Fire Incidents at Land Use Categories***

Land Use	Annual Fire Incidents Per Unit of Development		Fire Station Cost At \$71.20 Per Incident	Fire Station Cost At 30 Year Life
Residential	per dwelling unit	0.0082000	0.5844	17.5334
<u>Non-Residential</u>				
Hospital/Clinic	per sq. ft.	0.0001154	0.0082	0.2465
Nursing Homes	per sq. ft.	0.0002179	0.0155	0.4655
Retail	per sq. ft.	0.0000570	0.0041	0.1217
Restaurant/Bar/Lounge	per sq. ft.	0.0001120	0.0080	0.2392
Leisure/Outdoors	per sq. ft.	0.0004414	0.0314	0.9428
Schools/Colleges	per sq. ft.	0.0000273	0.0019	0.0583

Table 23 combines the capital costs of all types of apparatus and station (from Tables 18 – 22) to show the total capital cost of responses to fire incidents per unit of development. For example, residential dwelling unit costs are added as follows:

<u>Cost Component</u>	<u>Cost</u>	<u>Source</u>
Aerial	\$ 18.3972	Table 18
Engine	2.8381	Table 19
Rescue	0.7210	Table 20
Squad	1.4250	Table 21
Station	<u>17.5334</u>	Table 22
Total	40.91	

This example is repeated for each land use to combine its capital costs of all types of apparatus and station in Table 23.

***Table 23: Total Capital Cost Of Responses to Fire Incidents at Land Use Categories***

<u>Land Use</u>	<u>Unit of Development</u>	<u>Fire Incident Cost of All Apparatus and Station</u>
Residential	per dwelling unit	40.91
<u>Non-Residential</u>		
Hospital/Clinic	per sq. ft	0.59
Nursing Home	per sq. ft.	1.11
Retail	per sq. ft.	0.29
Restaurant/Bar/Lounge	per sq. ft.	0.57
Leisure/Outdoors	per sq. ft.	2.24
Schools/Colleges	per sq. ft.	0.14

## 5. CAPITAL COST PER RESCUE INCIDENT

This chapter identifies the capital cost of apparatus and stations that are the basis for emergency responses to rescue incidents.

### Annual Cost Per Apparatus

The annual cost per type of apparatus is the same as Tables 3 through 6:

### Cost Per Apparatus Per Fire or Rescue Incident

The cost per apparatus per fire or rescue incident is the same as Table 7.

### Total Apparatus Cost Per Rescue Incident

The calculation of apparatus cost per rescue incident is similar to the calculation of fire costs in Table 10. The total apparatus cost per rescue incident is calculated by multiplying the cost per apparatus per response by the percent of rescue incidents each type of apparatus responds to. This calculation accounts for the fact that multiple apparatus are dispatched to many incidents. The result of this calculation is a weighted average total cost of apparatus per rescue incident.

$$\begin{array}{ccccc} \text{Cost} & & \text{Apparatus} & & \text{Total} \\ \text{Per Apparatus} & \times & \text{Percent} & = & \text{Apparatus Cost Per} \\ \text{Per Response} & & \text{of Rescue} & & \text{Rescue Incident} \\ & & \text{Responses} & & \end{array}$$

Different types of rescue emergencies need different types or combinations of apparatus. As a result, the usage of apparatus varies among the types of apparatus. This variance is an important factor in determining the cost per incident. The percent of rescue responses by each type of apparatus is calculated in Table 24 by dividing the annual rescue responses for each type of apparatus by the total annual rescue incidents from Table 8. The result of the calculation in Table 24 is the percent of rescue incidents responded to by each type of apparatus. For example, Rescue Vehicles provided 1,340 responses to the 1,783 rescue incidents, equaling 75.2% of all rescue incidents. Another way to understand this data is that

one average rescue incident involved 0.752 rescue vehicles therefore the cost of responding to a rescue incident includes 75.2% of the cost of a Rescue vehicle.

**Table 24: Rescue Incident Response By Type of Apparatus**

Type Of Apparatus	Total Annual Rescue Responses For All Apparatus	Annual Rescue Incidents	Percent of Rescue Incidents Dispatched To
Aerial	0		0.0%
Engine	1,930		108.2%
Rescue	1,340		75.2%
Squad	<u>1,546</u>		86.7%
Total	4,816	1,783	

The final step in calculating the apparatus cost per rescue incident is shown in Table 25. The cost per response for each type of apparatus (from Table 7) is multiplied by the percent of rescue incidents dispatched to (from Table 24) resulting in the total apparatus cost per rescue incident.

The “bottom line” in Table 25 is the apparatus cost per rescue incident of \$66.14. In other words, every rescue incident “uses up” \$66.14 worth of apparatus.

**Table 25: Total Apparatus Cost Per Rescue Incident**

Type Of Apparatus	Apparatus Cost Per Response	Annual Percent of Rescue Incidents Dispatched To	Apparatus Cost Per Rescue Incident
Aerial	\$ 293.40	0.0%	\$ 0.00
Engine	21.20	108.2%	22.94
Rescue	24.39	75.2%	18.33
Squad	28.68	86.7%	<u>24.87</u>
Total			66.14

## **Station Cost per Fire and Rescue Incident**

The station cost per Rescue incident is the same as Table 12.

## 6. ANNUAL COST OF RESCUE INCIDENTS BY LAND USE

This chapter identifies the number and cost of responses to rescue incidents at each type of land use.

### Annual Rescue Incident Rate Per Unit Of Development

In this chapter the annual rescue incident rate per unit of development is calculated using the same methodology as described for fire incidents in Chapter 4.

During 2003 the Villages Public Safety Department responded to 1,042 rescue incidents within the Sumter County portion of its service area. Of the 1,042 rescue incidents 974 were traceable to a type of development (i.e., the incident occurred at a specific type of property such as a residence or business) or they were traffic-related (occurred on a roadway) and were included in the following detailed analysis of incidents to land uses. Of the 974 rescue incidents analyzed 906 occurred at a specific type of property and 68 were traffic-related. The remaining 68 rescue incidents were not traceable to either a type of land use or a traffic-related incident. Table 26 shows the allocation of the 68 incidents without land use designations to the property and traffic categories using the same basis as the 974 incidents for which a location was identifiable. Thus 969 of the 1,042 rescue incidents were allocated the same as the incidents at identifiable lands uses, and the other 73 rescue incidents were allocated the same as the traffic-related incidents.

*Table 26: Rescue Incidents*

Incident Location	Incidents Identifiable by Location	Incidents Not Identifiable by Location	Total Incidents
Total	974	68	1,042
At Properties	906	63	969
% of Total	93.0%	93.0%	93.0%
In Roads and Streets	68	5	73
% of Total	7.0%	7.0%	7.0%



There are four tables that present the allocation of rescue incidents among types of land use: Table 27 shows the rescue incidents that were identifiable by land use type, Table 28 shows the rescue incidents that were traffic-related. Table 29 combines the rescue incident data, and Table 30 shows the rescue incident rate per unit of development.

Table 27 shows the distribution of the 906 rescue incidents that are direct to a land use along with the percent distribution of these 906 incidents. In the right hand column the total 969 rescue incidents to land use (906 traceable + 63 allocated) is allocated among the land use types using the percent distribution column. The result is the total annual rescue incidents at each of the land use types.

***Table 27: Rescue Incidents At Specific Land Uses***

Land Use	Annual Rescue Incidents Identifiable To Land Use	Percent Of All Rescue Incidents Identifiable To Land Use	Annual Rescue Incidents Allocated To Land Uses (% x 969)
Residential	744	82.12%	796
Non-Residential			
Hospital/Clinic	64	7.06%	68
Nursing Home	40	4.42%	43
Retail	15	1.66%	16
Restaurant/Bar/Lounge	14	1.55%	15
Leisure/Outdoors	23	2.54%	25
Schools/Colleges	6	0.66%	6
Total	906		969

The traffic-related rescue incidents are allocated to land uses on the basis of the amount of traffic generated by each type of land use. In Table 28, the number of dwelling units and square feet of non-residential construction in the Sumter County portion of the Villages Fire service area is multiplied times the number of trips that are generated by each land use type as reported in the 7<sup>th</sup> Edition of Trip Generation by the Institute of Transportation Engineers (ITE). (The trip rates in are one-half of ITE's trip rates in order to account for the trips each land use generates while excluding the "return" trip). The result is the total trips associated with each land

use type. The percent of trips associated with each land use type is calculated from the total of all trips.

In the final calculation in Table 28 the total 73 annual rescue incidents that are traffic-related (68 traceable + 5 allocated) is allocated among the land use types using the percent of trips generated.

***Table 28: Traffic Related Rescue Incidents (Allocated to Land Uses)***

Land Use	Units Of Development in Villages (Sumter County Portion)	ITE Trip Generation Rate ÷ 2 Per Unit Of Development	Total Trips	Percent Of Trips Generated (Trips ÷ 61,502)	Annual Traffic Related Rescue Incidents Per Unit Of Development (% x 73)
Residential	10,951 d.u	4.78500	52,401	85.20%	62
<u>Non-Residential</u>					
Hospital/Clinic	101,764 sq.ft	0.00879	895	1.45%	1
Nursing Home	26,287 sq.ft	0.00305	80	0.13%	0
Retail	140,636 sq.ft	0.02147	3,019	4.91%	4
Restaurant/Bar/Lounge	52,246 sq.ft	0.06358	3,322	5.40%	4
Leisure/Outdoors	26,083 sq.ft	0.01166	304	0.49%	0
Schools/Colleges	229,689 sq.ft	0.00645	1,481	2.41%	2
Total			61,502		73

Table 29 summarizes the results of the analysis of rescue incidents. The total annual rescue incidents is a combination of the rescue incidents allocated among direct responses to land use categories (from Table 27) and the allocation of traffic-related incidents based on trip generation rates (from Table 28).

**Table 29: Total Annual Rescue Incidents By Land Use**

Land Use	Annual Rescue Incidents Direct To Land Use	Annual Traffic Related Rescue Incidents By Land Use	Total Annual Rescue Incidents By Land Use
Residential	796	62	858
Non-Residential			
Hospital/Clinic	68	1	70
Nursing Home	43	0	43
Retail	16	4	20
Restaurant/Bar/Lounge	15	4	19
Leisure/Outdoors	25	0	25
Schools/Colleges	6	2	8
Total	969	73	1,042

The final step in determining the annual rescue incident rate per unit of development is shown in Table 30. The total annual rescue incidents for each type of land use (from Table 29) are divided by the number of dwelling units or square feet of structures to calculate the annual rescue incident rate per dwelling unit or square foot. The units of development are the same as was used to determine traffic-related incidents (see Table 28).

The results in Table 30 show how many times an average unit of development has a rescue incident to which the Villages Public Safety Department responds. For example, a residential dwelling unit has an average of 0.0783421 rescue incidents per year. This is the same as saying that 7.83% of all residential dwellings have a rescue incident in a year. Another way of understanding this information is that an average residential dwelling unit would have a rescue incident once every 12.8 years.

**Table 30: Annual Rescue Incidents By Land Use**

Land Use	Total Annual Rescue Incidents To Land Use	Units Of Development	Annual Rescue Incidents Per Unit Of Development
Residential	858	10,951 d.u.	0.0783421 per dwelling unit
Non-Residential			
Hospital/Clinic	70	101,764 sq.ft	0.0006832 per sq ft
Nurssng Home	43	26,287 sq.ft	0.0016315 per sq ft
Retail	20	140,636 sq.ft	0.0001395 per sq ft
Restaurant/Bar/Lounge	19	52,246 sq ft	0.0003619 per sq ft
Leisure/Outdoors	25	26,083 sq.ft	0.0009572 per sq ft
Schools/Colleges	8	229,689 sq.ft	0.0000356 per sq ft
Total	1,042		

### **Rescue Incident Capital Cost Per Unit Of Development**

The capital cost of rescue incidents per unit of development is determined by multiplying the annual rescue incidents per unit of development (from Table 30) times the annual capital cost per rescue incident of each type of apparatus (from Table 25) and fire station (from Table 12), then multiplying that result times the useful life of the apparatus or fire station.<sup>3</sup>

$$\begin{array}{ccccccc}
 \text{Annual Rescue} & & \text{Annual Cost} & & \text{Useful} & & \text{Rescue Incident} \\
 \text{Incidents Per} & \times & \text{Per Rescue} & \times & \text{Life Of} & = & \text{Capital Cost} \\
 \text{Unit Of} & & \text{Incident} & & \text{Apparatus} & & \text{Per Unit Of} \\
 \text{Development} & & & & \text{or Station} & & \text{Development}
 \end{array}$$

In Tables 31 – 34 on the following pages, each rescue incident rate (from Table 30) is multiplied by the annual capital cost per rescue incident. The result is then

<sup>3</sup> Some fire and rescue impact fees are calculated for the economic life of the property paying the impact fee, rather than the useful life of the apparatus and stations that provide the fire and rescue services. Both methods meet the legal requirements for impact fees. The choice of method is made by the local government adopting the impact fee. The Villages in Sumter County decided to use the useful life of the apparatus and fire stations.

multiplied times the useful life of the apparatus or station to calculate the capital cost per unit of development for each type of apparatus and station.

Table 31 calculates the capital costs of an Engine per unit of development. For example, residential dwelling units average 0.0783421 fire incidents per year (i.e., 7.8% of a fire incident per year). Multiplying this times the annual capital cost of \$22.94 per incident produces the result that it costs \$1.7975 per dwelling unit to provide it with engines for one year. Since the engine lasts 15 years, the residential dwelling needs to pay for 15 times the annual rate, for a total of \$26.9624.

***Table 31: Engine Cost Of Responses to Rescue Incidents at Land Use Categories***

Land Use	Annual Rescue Incidents Per Unit of Development	Annual Engine Cost at At \$22.94 Per Incident	Total Engine Cost At 15 Year Life
Residential	per dwelling unit 0.0783421	1.7975	26.9624
<u>Non-Residential</u>			
Hospital/Clinic	per sq. ft. 0.0006832	0.0157	0.2351
Nursing Home	per sq. ft. 0.0016315	0.0374	0.5615
Retail	per sq. ft. 0.0001395	0.0032	0.0480
Restaurant/Bar/Lounge	per sq. ft. 0.0003619	0.0083	0.1245
Leisure/Outdoors	per sq. ft. 0.0009572	0.0220	0.3294
Schools/Colleges	per sq. ft. 0.0000356	0.0008	0.0122

Table 32 calculates the capital cost per unit of development for rescue vehicles by the rescue vehicle's capital cost per rescue incident (\$18.33 from Table 25). The result is then multiplied times the 7-year useful life of a rescue vehicle to calculate the capital cost per unit of development for rescue vehicles.

***Table 32: Rescue Vehicle Cost Of Responses to Rescue Incidents at Land Use Categories***

Land Use	Annual Rescue Incidents Per Unit of Development	Annual Rescue Cost At \$18.33 Per Incident	Rescue Cost At 7 Year Life
Residential	per dwelling unit 0.0783421	1.4357	21.5362
<u>Non-Residential</u>			
Hospital/Clinic	per sq. ft. 0.0006832	0.0125	0.1878
Nursing Home	per sq. ft. 0.0016315	0.0299	0.4485
Retail	per sq. ft. 0.0001395	0.0026	0.0383
Restaurant/Bar/Lounge	per sq. ft. 0.0003619	0.0066	0.0995
Leisure/Outdoors	per sq. ft. 0.0009572	0.0175	0.2631
Schools/Colleges	per sq. ft. 0.0000356	0.0007	0.0098

Table 33 calculates the capital cost per unit of development for squad apparatus responding to rescue incidents. The incident rate (from Table 30) is multiplied by the squad apparatus's capital cost per fire incident (\$24.87 from Table 25). The result is then multiplied times the 7-year useful life of a squad apparatus to calculate the capital cost per unit of development for squad apparatus.

**Table 33: Squad Cost Of Responses to Rescue Incidents at Land Use Categories**

Land Use	Annual Rescue Incidents Per Unit of Development	Annual Squad Cost At \$24.87 Per Incident	Squad Cost At 7 Year Life
Residential	per dwelling unit 0.0783421	1.9483	13.6384
<u>Non-Residential</u>			
Hospital/Clinic	per sq. ft. 0.0006832	0.0170	0.1189
Nursing Home	per sq. ft. 0.0016315	0.0406	0.2840
Retail	per sq. ft. 0.0001395	0.0035	0.0243
Restaurant/Bar/Lounge	per sq. ft. 0.0003619	0.0090	0.0630
Leisure/Outdoors	per sq. ft. 0.0009572	0.0238	0.1666
Schools/Colleges	per sq. ft. 0.0000356	0.0009	0.0062

Table 34 calculates the capital cost per unit of development for fire stations that house rescue apparatus. The rescue incident rate (from Table 30) is multiplied by the fire station's capital cost per fire and rescue incident (\$71.20 from Table 12). The result is then multiplied times the 30-year useful life of a fire station to calculate the capital cost per unit of development for fire stations.

**Table 34: Fire Station Cost of Responses to Rescue Incidents at Land Use Categories**

Land Use	Annual Rescue Incidents Per Unit of Development	Fire Station Cost At \$71.20 Per Incident	Fire Station Cost At 30 Year Life
Residential	per dwelling unit 0.0783421	5.5783	167.3502
<u>Non-Residential</u>			
Hospital/Clinic	per sq. ft. 0.0006832	0.0486	1.4594
Nursing Home	per sq. ft. 0.0016315	0.1162	3.4851
Retail	per sq. ft. 0.0001395	0.0099	0.2980
Restaurant/Bar/Lounge	per sq. ft. 0.0003619	0.0258	0.7730
Leisure/Outdoors	per sq. ft. 0.0009572	0.0682	2.0446
Schools/Colleges	per sq. ft. 0.0000356	0.0025	0.0760

Table 35 combines the capital costs of all types of apparatus and station (from Tables 31 – 34) to show the total capital cost of responses to rescue incidents per unit of development. For example, residential dwelling unit costs are added as follows:

<u>Cost Component</u>	<u>Cost</u>	<u>Source</u>
Engine	\$ 26.9624	Table 31
Rescue	21.5362	Table 32
Squad	13.6384	Table 33
Station	<u>167.3502</u>	Table 34
Total	229.49	

This example is repeated for each land use to combine its capital costs of all types of apparatus and station in Table 35.

***Table 35: Total Capital Cost Of Responses to Rescue Incidents at Land Use Categories***

<u>Land Use</u>	<u>Unit of Development</u>	<u>Rescue Incident Cost of All Apparatus and Station</u>
Residential	per dwelling unit	229.49
<u>Non-Residential</u>		
Hospital/Clinic	per sq. ft	2.00
Nursing Home	per sq. ft.	4.78
Retail	per sq. ft.	0.41
Restaurant/Bar/Lounge	per sq. ft.	1.06
Leisure/Outdoors	per sq. ft.	2.80
Schools/Colleges	per sq. ft.	0.10



## 7. IMPACT FEE PER UNIT OF DEVELOPMENT

In this chapter the fire and rescue cost per unit of development (from Chapters 4 and 6) are used to calculate the total fire protection facilities cost per unit of development. This chapter also addresses the credits for payments of other revenues. The revenue credits are subtracted from the total fire protection facilities cost per unit of development and the result is the fire impact fee rates for the portion of the Villages within the boundaries of Sumter County.

### Fire and Rescue Cost Per Unit Of Development

The fire and rescue cost per unit of development (from chapters 4 and 6) are combined to determine the total fire and rescue cost per dwelling unit or non-residential square foot.

$$\begin{array}{ccccc} \text{Fire Incident} & & \text{Rescue Incident} & & \text{Fire and Rescue} \\ \text{Cost Per} & & \text{Cost Per} & & \text{Cost Per} \\ \text{Unit of} & + & \text{Unit of} & = & \text{Unit Of} \\ \text{Development} & & \text{Development} & & \text{Development} \end{array}$$

In Table 36 the fire and rescue cost per unit of development (from Tables 23 and 35) are added together to determine the fire and rescue cost per dwelling unit or non-residential square foot.

**Table 36: Fire Station Cost of Responses to Rescue Incidents at Land Use Categories**

Land Use	Unit of Development	Fire Incident Life Cost Of All Apparatus And Station	Rescue Incident Life Cost Of All Apparatus And Station	Fire and Rescue Life Cost of All Apparatus And Station
Residential	per dwelling unit	40.91	229.49	270.40
<u>Non-Residential</u>				
Hospital/Clinic	per sq. ft.	0.59	2.00	2.59
Nursing Home	per sq. ft.	1.11	4.78	5.89
Retail	per sq. ft.	0.29	0.41	0.70
Restaurant/Bar/Lounge	per sq. ft.	0.57	1.06	1.63
Leisure/Outdoors	per sq. ft.	2.24	2.80	5.05
Schools/Colleges	per sq. ft.	0.14	0.10	0.24

### **Adjustments (Revenue Credits) and Impact Fees**

The final step in determining the fire protection impact fee is to reduce the cost per dwelling unit or non-residential square foot by subtracting any credits for other revenue from existing and new development that the Villages in Sumter County will use to pay for part of the cost of the same fire protection facilities that are the basis of the impact fee.

$$\begin{array}{rcccl}
 \text{Fire and Rescue} & & \text{Adjustment} & & \text{Impact Fee} \\
 \text{Cost Per} & & \text{For Revenue} & & \text{Per} \\
 \text{Unit of} & - & \text{Credits} & = & \text{Unit Of} \\
 \text{Development} & & & & \text{Development}
 \end{array}$$

New development will be given an adjustment for future payments of other revenues that are used to pay for the same new fire protection facilities that are required to serve the new development.

Adjustments are *not* given for other payments that are *not* used for new fire protection facilities needed for new development. Such an adjustment would extend to payments of all taxes for all purposes to all forms of governments, which contradicts the well-established system of restricting fees, charges, and many taxes

for specific public facilities and services<sup>4</sup>. Adjustments are not given for revenues that are used for repair, maintenance or operating costs because impact fees are not used for such expenses.

The only revenue sources to be included in the adjustment are those which are used for fire protection facilities capacity expansion according to law and local policy or practice. The Villages in Sumter County uses special fees to pay for all capital costs of fire and rescue capital facilities that are not eligible for impact fees, such as replacement or renovation of existing stations and apparatus. For the purpose of this impact fee rate study, it is assumed that the Villages will use other sources of revenue to pay for 10% of the cost of fire and rescue capital facilities needed to serve new development.

As a result, the revenue credit per dwelling unit or square foot is 10% of the total fire and rescue cost per unit of development. Table 37 shows the cost per dwelling unit or non-residential square foot from Table 36, the 10.00% revenue credit adjustment, and the impact fee after the credit is subtracted from the full cost.

***Table 37: Impact Fees By Land Use***

Land Use	Total Fire and Rescue Cost Per Unit Of Development	Adjustment (10% Revenue Credit)	Fire and Rescue Impact Fee Per Unit of Development
Residential	270.40	27.04	243.36 per dwelling unit
Non-Residential			
Hospital/Clinic	2.59	0.26	2.33 per sq ft
Nursing Home	5.89	0.59	5.30 per sq ft
Retail	0.70	0.07	0.63 per sq ft
Restaurant/Bar/Lounge	1.63	0.16	1.47 per sq ft
Leisure/Outdoors	5.05	0.50	4.54 per sq ft
Schools/Colleges	0.24	0.02	0.22 per sq ft

<sup>4</sup> An example of this principle is found in the impact fee statutes for the State of Washington. In the following statute, a "system improvement" is a capital improvement that can be financed by impact fees. RCW 82.02.060(1)(b) requires an adjustment for revenue credits to be given for "...payments made or reasonably anticipated to be made by new development to pay for particular system improvements in the form of user fees, debt service payments, taxes, or other payments *earmarked for or proratable to the particular system improvement* (emphasis added);"

## APPENDIX: CREDITS FOR FIRE STATION CONSTRUCTION

Most impact fee ordinances have a provision that allows an applicant for a development order to provide land, buildings or other improvements that are for the same things that the impact fee is for, in return for a "credit" against the amount of the impact fee.

The Villages has a history of fire stations being built by the developer, and this practice can continue. The purpose of this appendix is to calculate the portion of the impact fee that is attributable to the fire station so that future impact fee payers will know what portion of their impact fee has been, or will be, reduced if the developer builds a fire station needed by new development.

The cost per emergency response is the baseline for determining how much of the impact fee is for fire stations, and how much is for apparatus. Table 12 calculated that the fire station cost per response is \$71.20. There are two kinds of emergency responses: fire and rescue. The apparatus cost for a fire emergency is \$172.47 (see Table 10). The apparatus cost for a rescue emergency is \$66.14 (see Table 25). The following table summarizes this information, and calculates the fire station cost per response as a percent of the total cost per response.

<u>Capital Cost</u>	<u>Fire Calls</u>	<u>Rescue Calls</u>
Apparatus	\$ 172.47	\$ 66.14
Stations	<u>71.20</u>	<u>71.20</u>
Total Cost per Response	243.67	137.34
Station Cost % of Total Cost	29.2%	51.8%

Most of the emergency responses are for rescue calls, based on the data from Table 8.

	<u>Fire Calls</u>	<u>Rescue Calls</u>	<u>Total Calls</u>
Number of Calls	139	1,042	1,181
Percent of All Calls	11.8%	88.2%	100%

The data from the two tables above can be combined to create the combined portion of the total impact fee that is for fire stations, and not for apparatus.

<u>Capital Cost</u>	<u>Fire Calls</u>	<u>Rescue Calls</u>	<u>Combined</u>
Station Cost % of Total Cost	29.2%	51.8%	N.A.
Call Type % of Total Calls	<u>11.8%</u>	<u>88.2%</u>	N.A.
Percent For Fire Stations	3.4%	45.7%	49.1%%

The result of this analysis is that 49% of impact fees are for fire stations, and the other 51% is for apparatus.

If impact fees are collected before a new fire station is built, the County can reserve 49% of those impact fees to pay for part of the cost of the new fire station. For impact fees that are paid after a new fire station is built (if it is built by the developer), those impact fees are entitled to be reduced by 49% as a credit for the fire station built by the developer.